

Sustainable management of contaminated sites

Presentation 1.2

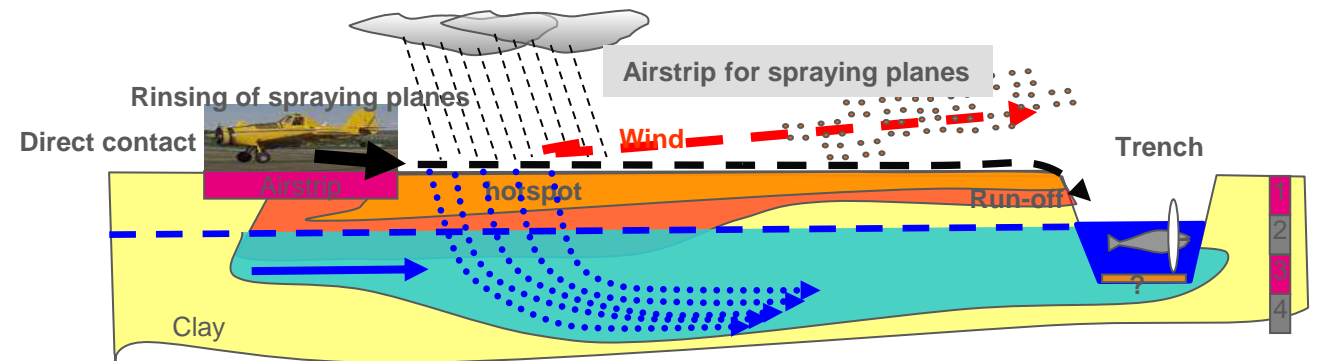
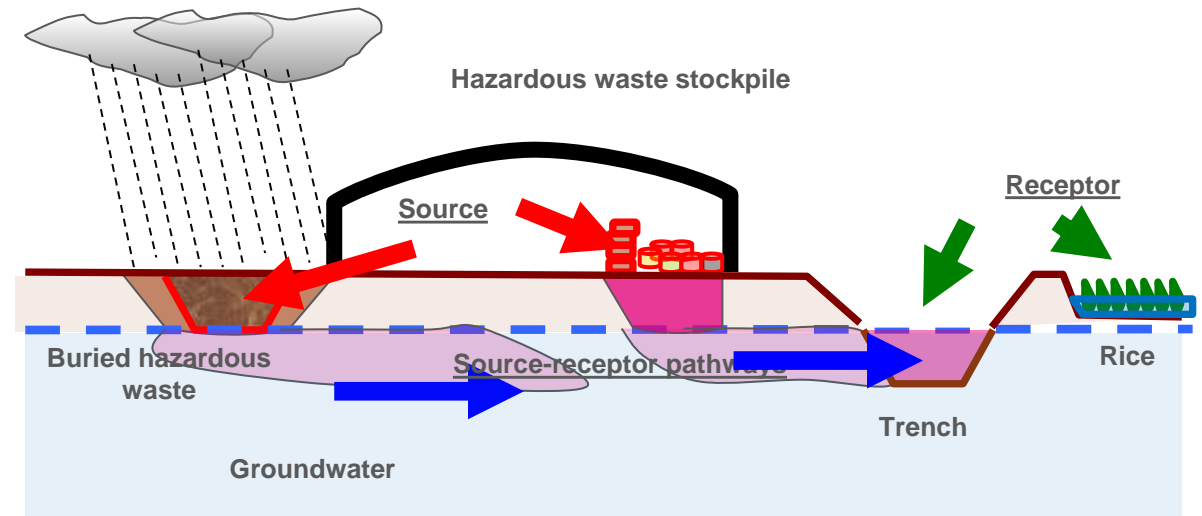
Phase 1 - Gap analysis ICSM and survey and analyses plan

Boudewijn Fokke

October, 2021

Content of presentation

- Gap analysis objectives
- Questions to be answered
- Completed gap analysis
- Survey, sampling and analyses plan



Source – Path – Receptor



Gap analysis objectives

- **Gap analysis bridges**

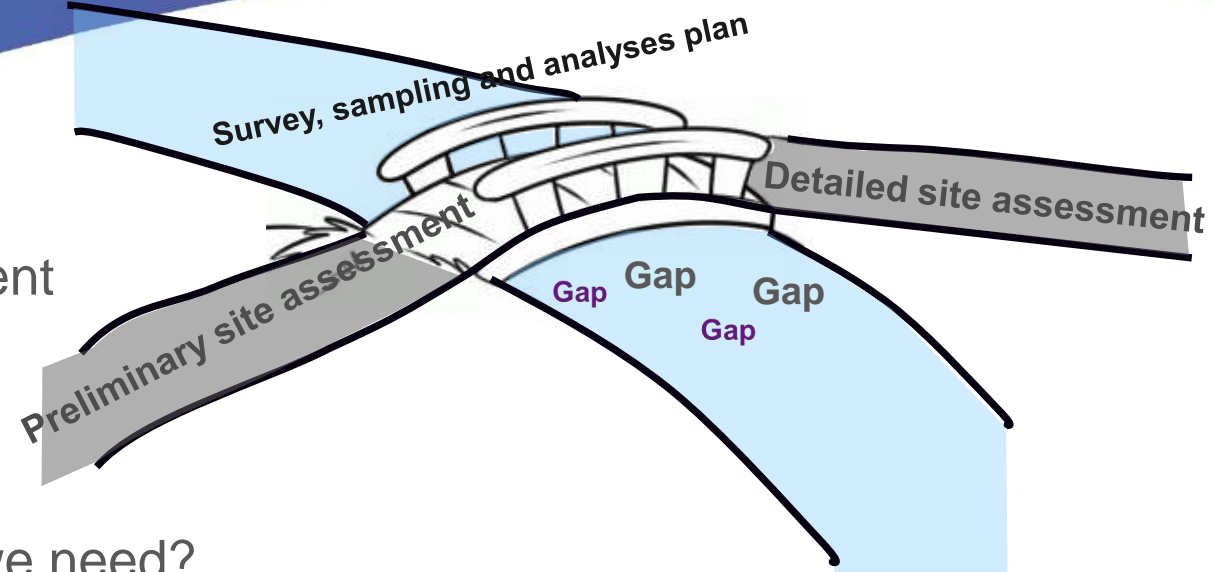
- Phase 1 the Preliminary Site Assessment
- Phase 2 the Site Assessment

- **Answer the following questions**

- What type of survey / assessment do we need?
- What do we have to know to complete the CSM?
- What do we have to know to design the site cleanup / remediation?

- **Input for the survey, sampling and analyses plan of Phase 2 the Site assessment**

- Identified Sources
- The potential Source - Receptors Pathways
- The potential Receptors



Gap analysis ICSM

Stockpile of drums containing oil, electrical equipment and waste containing PCB

Question: What type of survey? - Stockpile Inventory

Hazardous Waste in bunkers

- Around 2,000 liters of hazardous fluids?
- Around 5 m³ of solid waste not packed?
- PCB containing waste?
- Number of electrical equipment

Hazardous Waste in front and North of bunkers

- Around 15 m³ construction waste including asbestos?

Drums are open and fill up with rainwater causing spills!



Gap analysis ICSM

Stockpile hazardous waste

Question: What do we have to know to complete the CSM?

- **Source**
 - The types of hazardous waste
 - The amount hazardous waste
 - The state of packaging
- **Source - Receptor pathways**
 - Condition of the doors and windows of the storage
 - Condition of floor of the storage
 - Condition of roof of the storage
 - Condition of the walls of the storage
 - Soil type under and around the storage building
- **Receptors**
 - Other uses of the building
 - If the soil and groundwater are contaminated



Gap analysis ICSM

Stockpile hazardous waste

What do we have to know to design the site clean-up?

- The completed CSM of the stockpile with hazardous waste
- Accessibility of the storage
- The onsite HSE rules and demands
- The type of repackaging materials needed
- The capacity of the local contractors
- The available budget
- The in-country available disposal technique(s)
- The future use of the storage building
- The cost for the repackaging and disposal



Gap analysis ICSM

Buried or dumped hazardous waste

Question: What type of survey?

Depot survey



Pit survey

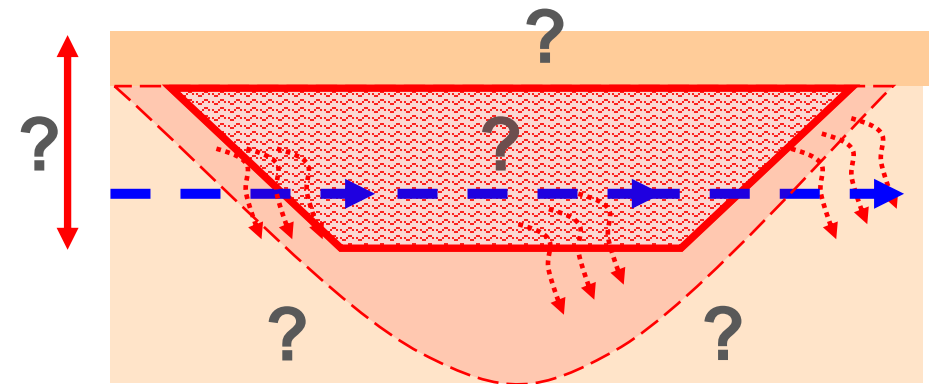


Gap analysis ICSM

Buried hazardous waste

Question: What do we have to know to complete the CSM?

- **Source**
 - Dimensions of the pit
 - Type of buried hazardous waste
 - Type of pit cover and lining
- **Source - Receptor pathways**
 - Soil type
 - Soil and groundwater contamination
 - Groundwater depth, flow direction & velocity
- **Receptors**
 - Current surrounding land-use
 - Future surrounding land-use
 - Current groundwater use



Gap analysis ICSM

Buried hazardous waste

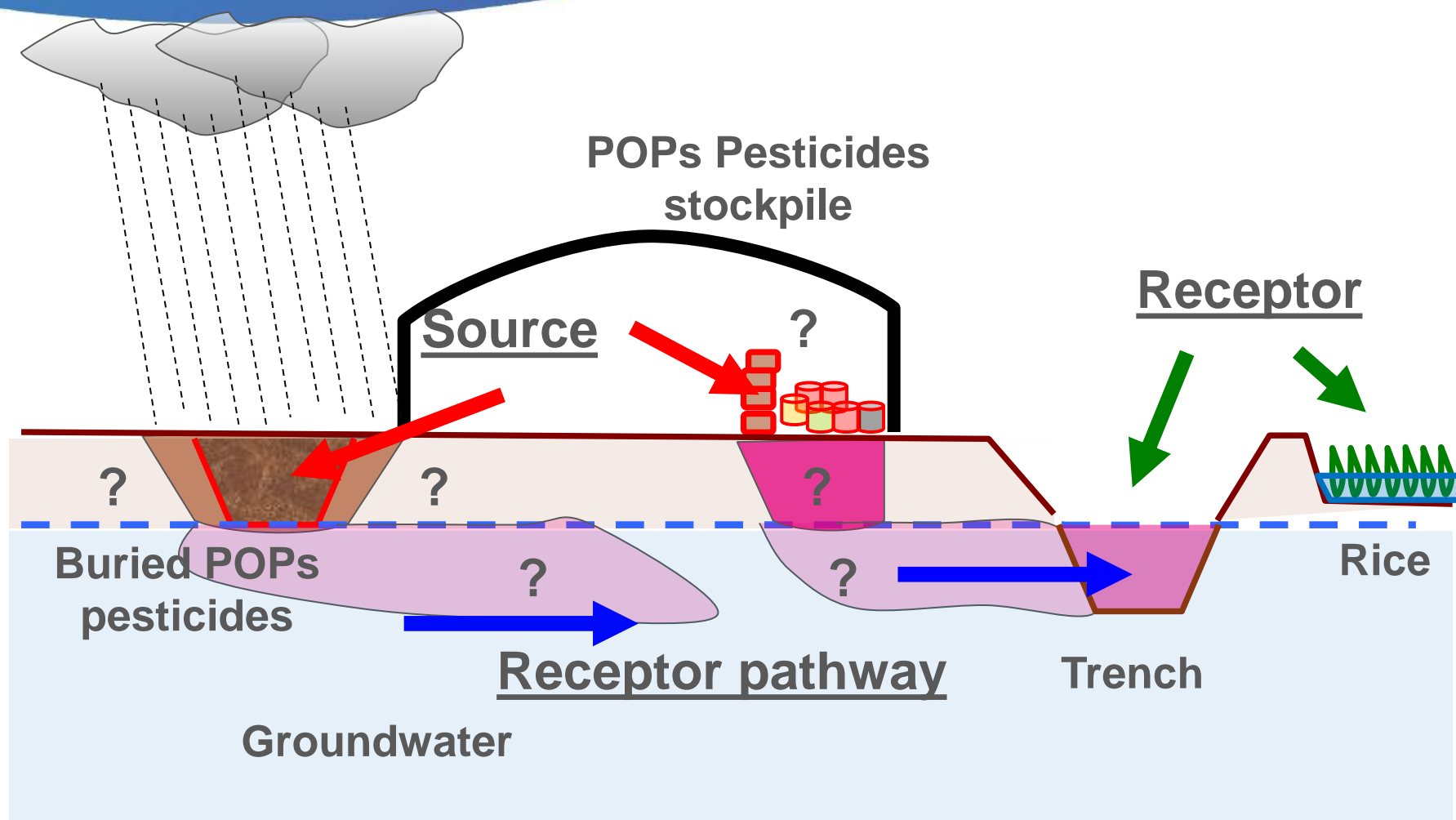
Question: What do we have to know to design the pit remediation?

- The completed CSM of the buried hazardous waste
- Accessibility of the location with the pit
- The onsite HSE rules and demands
- The type of repackaging materials
- The capacity of the local contractors
- The available budget
- The in-country available disposal technique(s)
- The future use of the site
- The cost for the remediation of the pit



Gap analysis ICSM

Complete



Gap analysis ICSM

Contaminated soil and groundwater

Question: What type of survey?

Soil and groundwater survey



Gap analysis ICSM

Contaminated soil and groundwater

Question: What do we have to know to complete the CSM?

• Primary Source

- Dimensions of the hotspot
- Type(s) of contamination in the hotspot
- The soil type of the hotspot
- The groundwater depth in the hotspot

• Source - Receptor pathways

- Soil type
- Soil and groundwater contamination
- Groundwater depth, flow direction & velocity

• Receptors

- Current surrounding land-use
- Future surrounding land-use
- Current groundwater use

• Secondary Sources

- The soil type
- Dimensions of the soil contamination
- Type(s) of contamination

• Source - Receptor pathways

- Dimension of groundwater contamination
- Groundwater depth, flow direction & velocity

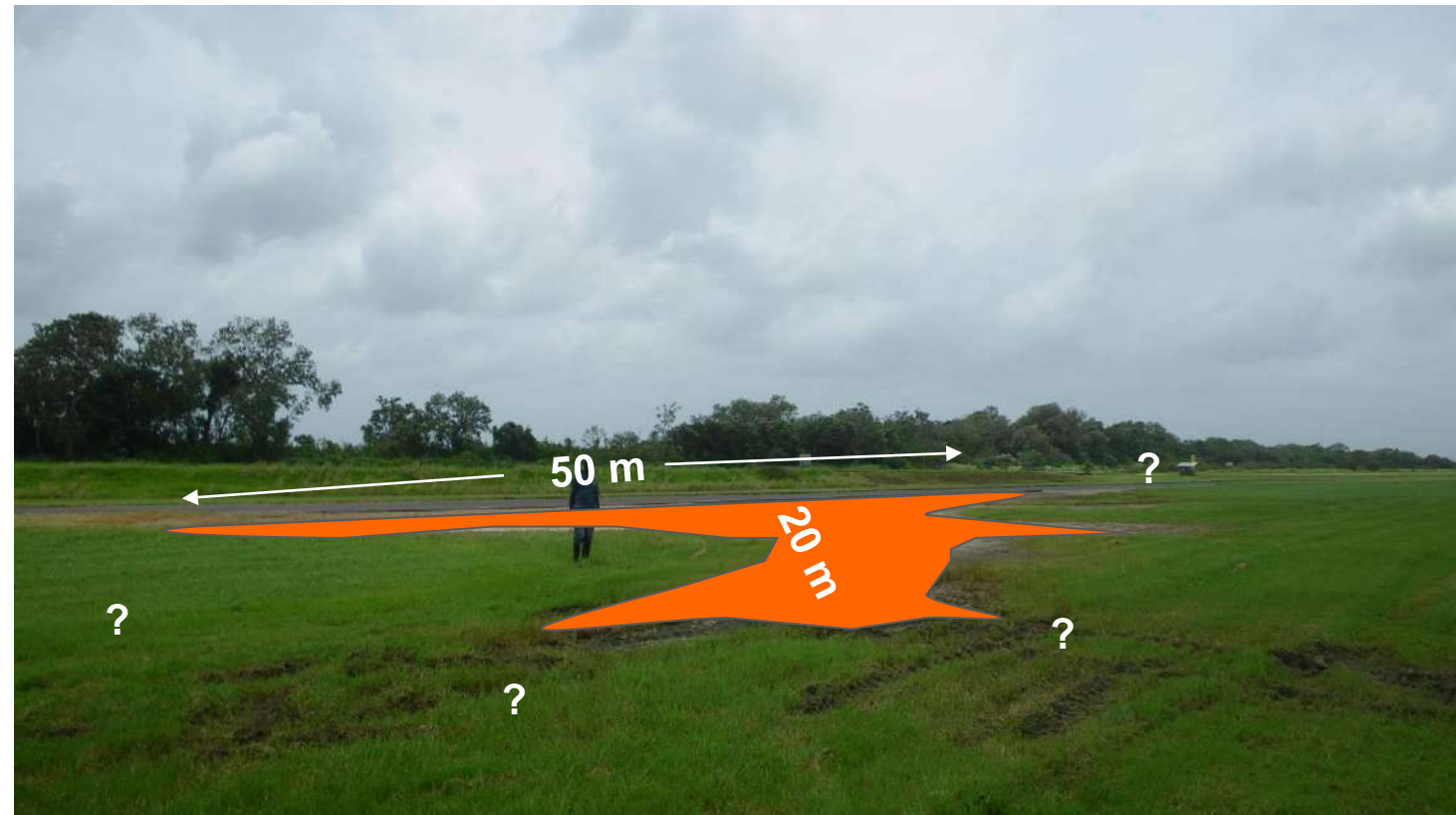
• Receptors

- Current surrounding land-use
- Future surrounding land-use
- Current groundwater use



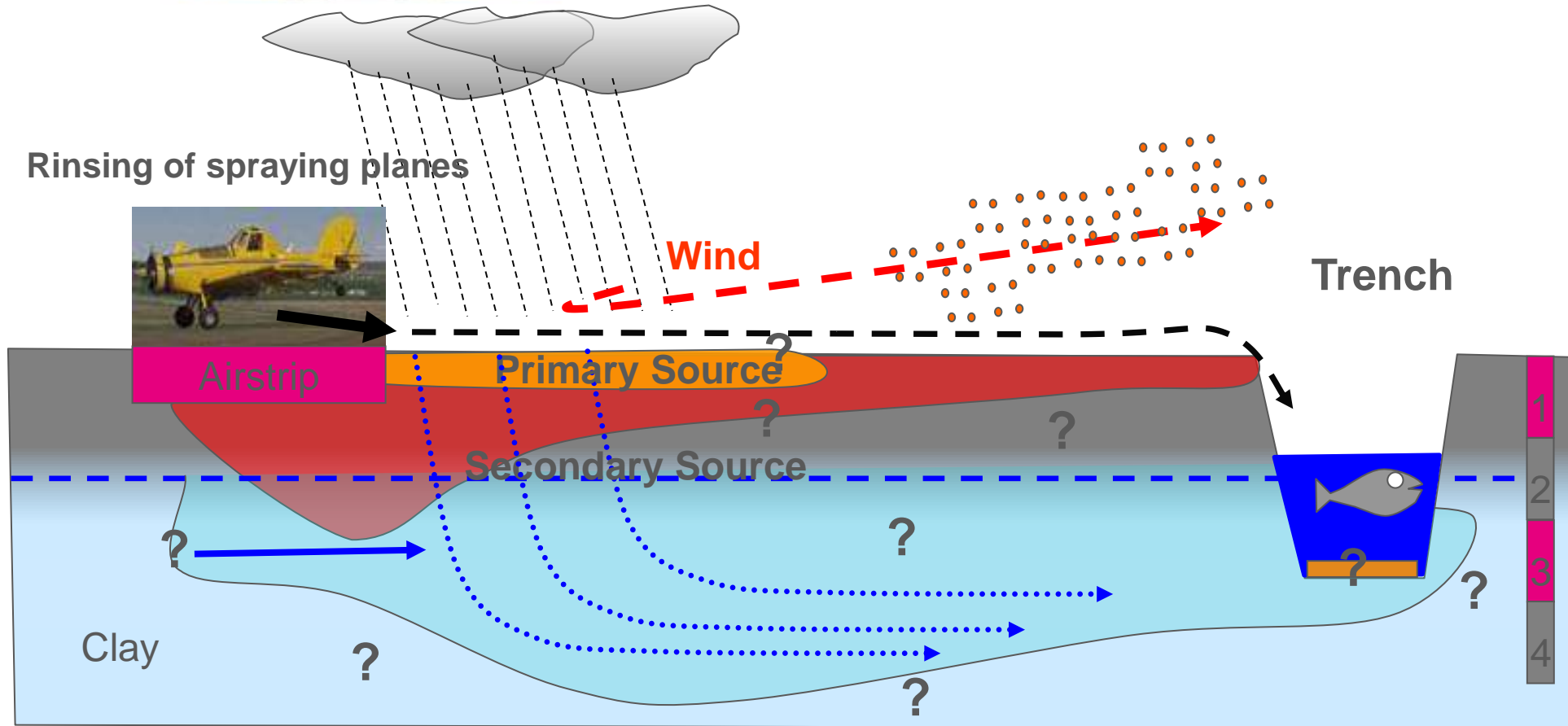
Gap analysis ICSM Contaminated soil and groundwater

Primary Source high levels of contaminants in soil and groundwater contamination



Gap analysis ICSM

Complete



Source – Receptor pathway - Receptor



Survey, sampling and analyses plan

Site component	Source			Receptor - pathways			Receptor			
	Activities	boring	wells	samples	boring	wells	samples	sediments	Surface water	samples
Baseline		1	1	2						
Hazardous waste stockpile		1	1	2	5	2	5			
Buried hazardous waste		1	1	2	5	2	7			
Primary source rinsing place		10	1	2						
Secondary source rinsing place		20	1	25		4		2	1	3



Example - Survey, sampling and analyses plan PCB contaminated sites



Assignment Gap analysis

What do I need to know to complete my CSM

Site component - Waste – Inventory should provide answers to the following questions

Are inventory data available?

- If yes, when is this inventory made?
- Is since then anything changed?

Closed application: do you know

- Total number of the different types?
- The number damaged and leaking per type?
- Number per type intact?
- Storage conditions?
- The PCB content analyze of representative oil samples?

• Drums and waste: do you know

- Total number of drums of different types and size?
- The number damaged and leaking for each types and size?
- Number intact for types and size?
- Storage conditions?
- The content of the different drums?
- Are these inventory data recorded?
- If yes, when is this inventory made?
- Is since then anything changed



Assignment Gap analysis

What do I need to know to complete my CSM

Site component – Contaminated soil and groundwater – the assessment should give answers to the following questions

Soil: do you know

- The soil type (layers, texture, signs of contamination)?
- The horizontal and vertical extent of the different hotspots?
- The Contaminants of Concern and the concentrations in the soil of hotspot(s)
- The horizontal and vertical extent of soil contamination outside the hotspots?
- The Contaminants of Concern and the concentrations in the soil outside the hotspot(s)?
- The onsite runoff / drainage and slope direction?
- If a surface water body (down slope) receives run-off of the site?
- The main wind direction?

Groundwater: do you know

- The groundwater depth?
- The groundwater flow direction?
- The horizontal and vertical extent of groundwater contamination downstream outside the hotspots?
- The Contaminants of Concern and the concentrations in the groundwater below the hotspot?



Gap analyses is the bridge between Phase 1 and 2

Contact



Questions?



www.tauw.com

